

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
POST OFFICE BOX CN-029
TRENTON, N. J. 08625

REF
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1985

WINTER SHUTDOWN FISH SAMPLING REPORT

GPU Nuclear Corporation

February 1985

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Information Resource Center



EXECUTIVE SUMMARY

The discharge canal of the Oyster Creek Nuclear Generating Station was monitored during the February 1-3 period in order to document any cold shock related fish mortalities. Although thousands of herring and several hundred Atlantic menhaden were in the discharge canal at the time of the shutdown, only 17 dead fish were found. The results of the monitoring program indicated that most of the fish moved out of the discharge canal and into Barnegat Bay after the station shutdown.

6/23/10 OCLC # 643063742 Horizon # 404503

Introduction -

This report documents the effects of the February 1, 1985 shutdown of the Oyster Creek Nuclear Generating Station on the fishes in Oyster Creek based upon sampling conducted by GPU Nuclear Corporation.

The Oyster Creek Station began a refueling and maintenance outage in February of 1983. That outage lasted until the fall of 1984 when the station was restarted and generation levels were sufficient to cause intake-discharge temperature differences in excess of 10°F by early December 1984. At about the same time, the results of impingement sampling and qualitative gill net sampling in the condenser discharge indicated that significant numbers of Atlantic menhaden (Brevoortia tyrannus) and blueback herring (Alosa aestivalis) were accumulating in the condenser discharge after passing through the dilution pumps or being washed off the traveling screens. By early January, visual observations indicated that several hundred Atlantic menhaden and several thousand blueback herring (and probably other Alosa species) had gathered in the heated condenser discharge waters. When maintenance problems caused an unplanned shutdown on February 1, the potential for a significant fishkill existed. The following is a description of the effort by GPUN to determine the effect of that shutdown on the fishes in the discharge canal.

Materials and Methods -

The discharge canal was monitored continuously from 2200 hours on February 1 through 1400 hours on February 2 by a team of 6 biologists from GPU Nuclear and Ecological Analysts, Inc. An additional five biologists were on call and used as replacements during the monitoring effort.

Three types of monitoring methods were used:

- 1) Surveys of the discharge canal from the condenser discharge to the mouth of Oyster Creek were conducted by boat and on foot. Dead or stressed fish were collected with dip nets and water temperature was measured with a Yellow Springs Instruments S-C-T Meter.
- 2) Trawl samples were collected at the 4 locations indicated on Figure 1 with a 4.8m semiballoon trawl with a 3.9cm stretch mesh body, a 3.2cm stretch mesh cod end and a 1.3cm stretch mesh liner. One ten minute trawl sample was taken at each station except in the residential lagoon where the duration of the sample was limited by the length of the lagoon.
- 3) Divers swam transects across the discharge canal bottom at the seven locations indicated on Figure 1. All fish within arms reach were collected and observations of other fish were noted.

Water temperature data were obtained with continuous temperature monitors located at the condenser intake, condenser discharge and the Route 9 bridge.

Results and Discussion -

The menhaden and herring that were observed prior to the shutdown remained in the heated condenser discharge waters throughout the evening of February 1. As the condenser discharge water temperature began declining at 2200 hours (Fig. 2) the fish appeared to form tighter schools but did not appear stressed and were easily able to avoid dip nets.

The two operating dilution pumps were shut off at 2310. Without this source of cool water the temperature distribution in the discharge canal

changed so that by 0130 hours the Route 9 bridge temperature exceeded the condenser discharge temperature indicating a relatively warm water mass slowly moving down the discharge canal (Fig. 2). A small pocket of relatively warm water was also observed in the dilution pump discharge bays, presumably the result of warm condenser discharge water being trapped in this area rendered stagnant by the cessation of dilution pump activity.

At 0220 hours on February 2, when the condenser discharge water temperature was 47.3°F, the school of herring began to disperse and by 0330 hours they were no longer observed in the condenser discharge area. The menhaden remained in the condenser discharge until 0440 hours (discharge temp. = 41°F) when the school began to disperse.

Surveys of the discharge canal indicated that the herring had made their way down the canal to the Route 9 bridge where they were observed swimming normally at 0520 hours. The water temperature at Route 9 was 44°F at that time or approximately 3 degrees higher than that at the condenser discharge (Fig. 2). Apparently the herring were following the warm water mass described above as it moved down the discharge canal.

Approximately 100 menhaden were observed in the dilution pump discharge bays at 0600 hours, apparently attracted to the relatively warm water (40.8°F) trapped in that area. They remained there until 0700 hours when the water temperature had dropped to 38.3°F. Presumably, the remainder of the menhaden followed the warm water mass down the discharge canal.

Surveys of the discharge canal banks from the condenser discharge to the Oyster Creek mouth were conducted between 0800 and 1000 hours. A single menhaden that had been captured by a gull was found at 0810 on the south bank of the canal, west of the Route 9 bridge.

Trawl samples were collected between 0900 and 1100 hours at the locations shown in Figure 1. Winter flounder (Pseudopleuronectes americanus) and Atlantic silverside (Menidia menidia) were found at all stations and appeared to be in good condition. A single American shad (Alosa sapidissima), showing no signs of stress, was found at station T3.

Additional surveys of the discharge canal banks during the afternoon of February 2 yielded 3 dead or dying menhaden and one dead blueback herring (found by NJDEP biologists), all found near the Route 9 bridge.

The diver surveys conducted between 1100 and 1300 hours yielded several live and 2 dead winter flounder. The dead flounder showed obvious signs of mechanical damage as a result of being impinged; no menhaden or herring were observed.

Discharge canal surveys were also conducted on Sunday, February 3 and Monday, February 4. Six dead menhaden were found in the vicinity of the Route 9 bridge, 2 near the boat ramp on the Finninger Farm, 2 in a cove off Dock Avenue on the south bank of Oyster Creek, and 2 on the beach south of the Oyster Creek mouth.

The relatively small number of dead fish found on the banks of Oyster Creek (16 menhaden and 1 blueback herring) and the absence of dead fish on the bottom, indicate that most of the menhaden and herring moved out of Oyster Creek and into Barnegat Bay, probably following the warm water mass as described above. The fate of these fish in Barnegat Bay is unknown.

Figure 1

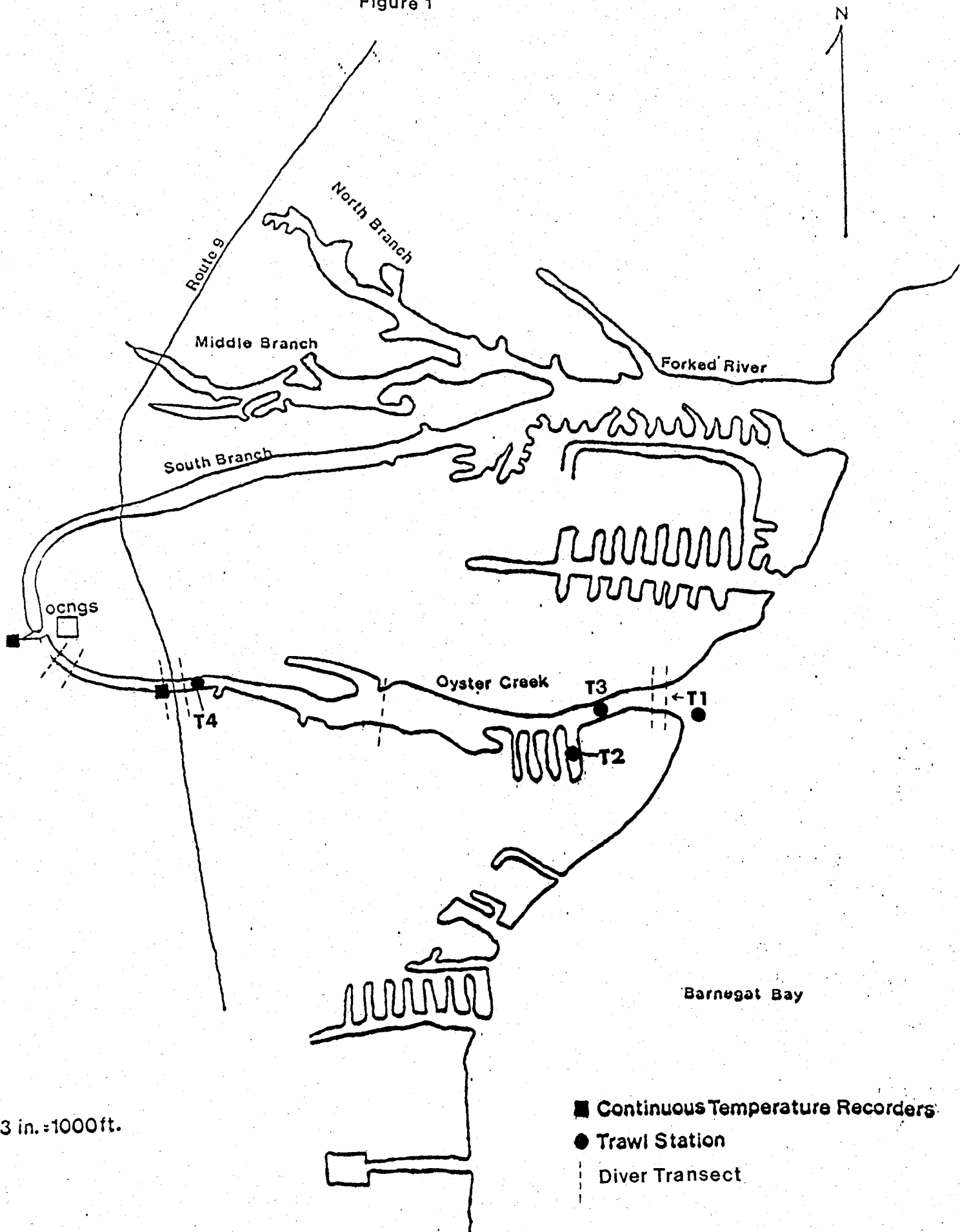


Figure 2

